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Gyalidea minuta in Central Europe – new data on its distribution, ecology, and morphological variation

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Abstract — New localities of *Gyalidea minuta* in Central Europe are reported. The distribution, ecology, and morphological variation of the species are discussed and differentiating characters presented.

Key words — lichenized fungi, lichens, *Solorinellaceae*, Poland, Czech Republic

Introduction

The genus *Gyalidea* was resurrected by Vězda (1966) and by Vězda & Poelt (1991). Currently included in the *Solorinellaceae* (Baloch et al. 2010). *Gyalidea* was earlier referred to the *Asterothyriaceae* and *Gomphillaceae* (see Henssen & Lücking 2002, Lumbsch & Huhndorf 2010). The genus is characterized by a crustose thallus, zeorine apothecia with a mostly well-developed thalline margin, an *Ostropales*-type ascus, a non-amyloid hymenium with simple to sparsely branched and septate paraphyses, and hyaline, muriform (or transversally septate) ascospores (Vězda 1966; Vězda & Poelt 1991; Henssen & Lücking 2002; Aptroot & Lücking 2002). The thallus is usually inconspicuous and the apothecia small. *Gyalidea* is a cosmopolitan genus with over 40 species (Vězda & Poelt 1991; Kirk & Cooper 2009), many of which have been described in the last two decades (see Lumbsch et al. 2009). They are rather rare lichens, some known only from the type material or very few collections. Most species grow on soil, rocks, mosses, or plant debris, and only a few occur on tree bark. In Europe there are only two epiphytic species, *G. minuta* (van den Boom & Vězda 1995) and the recently described *G. fruticola* (Svensson & Thor 2007). Until recently, *G. minuta* had been found only in three localities in southwestern and

western Europe. Here we report the first record of *G. minuta* in Central Europe and discuss its distribution, ecology, and morphological variation.

Materials & methods

The specimens were morphologically examined by standard microscopic techniques. Hand-cut sections and squash preparations were examined in water, a 10% aqueous solution of KOH, and Lugol's solution. Measurements of well-developed free ascospores lying outside the asci were measured in water at ×1000 magnification. The description below is based on the isotype and newly collected specimens.

The taxon

Gyalidea minuta Van den Boom & Vězda, Mycotaxon 54: 423. 1995. Fig. 1

Type: Portugal, Algarve (holotype, herb. van den Boom 14875 [not seen]; isotype, herb. A. Vězda (PRA-V-05556!)).

Thallus epiphloedal or partly endophloedal, corticolous, scattered among substrate wrinkles, grayish green, without visible prothallus. Apothecia sessile, hyaline with a brownish tinge, translucent when wet, 0.15–0.2 mm diam., 0.1 mm tall (0.2–0.4 × 0.1–0.15 mm in water preparation). Hymenium colorless, 45–75 µm tall. Paraphyses simple, not broadening towards the tips, 1.5–2.0 µm in diam., indistinctly septate. Asci cylindrical-clavate, wall slightly thickened at apex, 8-spored, 28–40 × 7–9 µm. Ascospores ellipsoid, with rounded to attenuate ends, muriform, with 3–5 transverse septa, and 1–3(–4) longitudinal septa, (9.5–)10–17(–20) × 4.5–7.5(–9) µm. Pycnidia not observed. Chemistry not tested by TLC.

Ecology – In western Europe the species has been reported from the bark of *Alnus glutinosa* and *Fraxinus* sp. trees in shady, humid forests and among shrubs (van den Boom & Vězda 1995, Sparrius et al. 2002).

In Poland, it has been found only in forest conditions. One locality is a narrow strip of land (ca. 50 m wide and about 2 km long) adjacent to a lake with an anthropogenic forest community of an unusual structure. The tree layer consists of middle-aged pine and the shrub layer of *Berberis* sp., *Crataegus* sp., *Euonymus europaeus*, *Rhamnus cathartica*, *Sambucus nigra* in which the common buckthorn (*R. cathartica*) dominates. The dense shrub-layer and the proximity to the lake give rise to highly humid sheltered conditions. *Gyalidea minuta* grows here on the bark of the buckthorns only and is intermixed with lichens common to this area (*Anisomeridium polypori* (Ellis & Everh.) M.E. Barr, *Bacidina sulphurella* (Samp.) M. Hauck & V. Wirth, *Coenogonium pineti* (Schrad. ex Ach.) Lücking & Lumbsch, *Lepraria incana* (L.) Ach., *L. lobificans* auct., *Melanelixia fuliginosa* (Fr. ex Duby) O. Blanco et al., *Micarea micrococca* (Körb.) Gams ex Coppins, *Psoroglaena abscondita* (Coppins & Vězda) Hafellner & Türk, *Parmelia sulcata* Taylor).

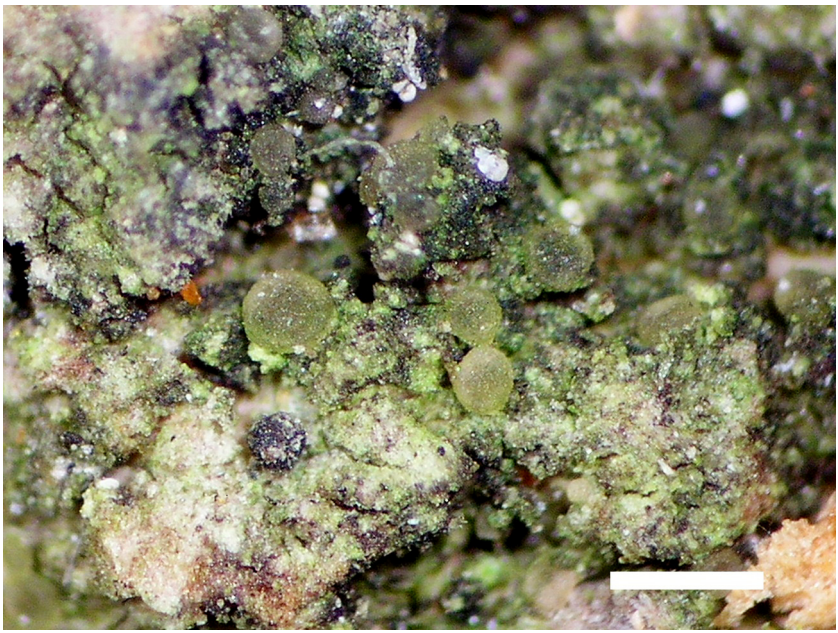

Figure 1. Habit of *Gyalidea minuta*. Scale bar = 0.5 mm.

The second locality is in a pine forest planted in soils that naturally favor oak–linden–hornbeam forest. In this habitat, *G. minuta* grows at the bottom of *Acer pseudoplatanus* trunks mixed with abundant *Bacidina sulphurella*. Other lichen species include *Lepraria incana*, *L. elobata* Tønsberg, and *Parmelia sulcata*.

In the Czech Republic *G. minuta* has been collected in a shady, damp forest of mostly *Alnus glutinosa* and *Fraxinus excelsior* within part of an old spruce–beech forest reserve. Here the species grows abundantly around bark rifts of *Fraxinus* trunks accompanied by *Lepraria* sp., *Lecanora pulicaris* (Pers.) Ach., and *Phlyctis argena* (Ach.) Flot.

Geographical distribution (Fig. 2) –Known only from Europe, *G. minuta* had been previously reported from Portugal (van den Boom & Vězda 1995), northern France, and Belgium (Sparrius et al. 2002).

Specimens examined: **POLAND**. **Warmia–Masuria**: Olsztyn Lake District, Olsztyn, Łupsztych settlement, near lake Ukiel (53°46′50″N 20°24′20″E), 10.VII. & 10.XI.2001, leg. D. Kubiak (OLTC L–1425, PRA-V-03137, PRA-V-03138); 15.IX.2002, leg D. Kubiak (OLTC L–1976); 26.IV.2005, leg D. Kubiak (OLTC L–2879); 7.II.2009, leg. D. Kubiak (OLTC L–3113); Olsztyn, Dajtki settlement, near lake Ukiel (53°46′53″N 20°25′20″E): 6.VI.2009, leg. D. Kubiak (OLTC L–3190). **CZECH REPUBLIC**. **Eastern**

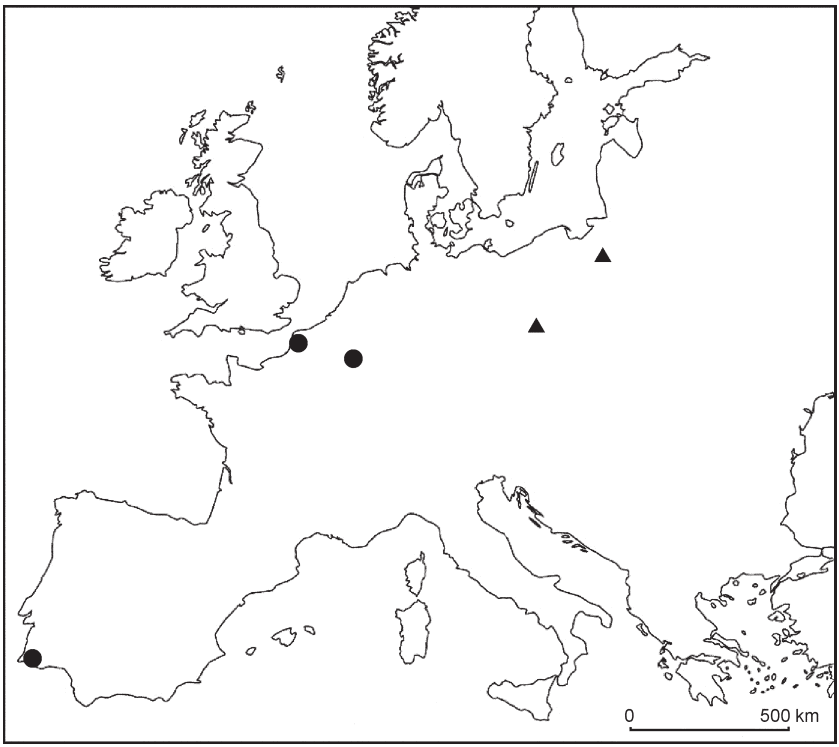

Figure 2. Distribution of *Gyalidea minuta*.
● – previously published localities, ▲ – new localities.

Bohemia: Železné hory Mts, Nasavrky–Horní Bradlo, Polom Nature Reserve (ca. 49°47′34″N 15°45′16″E), 24.IX.2009, leg. J. Malíček, J. Halda & A. Müller (herb. J. Malíček 2018).

Additional specimens examined: **PORTUGAL**: **Algarve**: Serra de Monchique, road 267 to S. Marcos da Serra (Alferce), 1.8 km E of crossing to Monchique (37°19.0′N 8°32.3′W), 28.VII.1993, leg. P.v.d. Boom (PRA-V-05556, isotype).

Comments – This constitutes the first report of *Gyalidea minuta* from Central Europe. The first specimen from Poland, found in 2001, differs from the type in apothecial shape and in the number and arrangement of septa. A. Vězda (pers. comm.) suggested that these differences were great enough to support a new species, but a final taxonomic decision was postponed in view of the small specimen size. No new material was found until 2009 when the first author found a larger population within 2 km of the first locality. In the same year the species was also found in the Czech Republic. Analysis of the rather rich material from both countries showed that all specimens represent a single

species, *Gyalidea minuta*. Detailed measurements have shown that the Central European specimens deviate slightly: the ascospores are slightly smaller with 3–4 transverse septa and the apothecia are generally larger and more flattened (Table 1). Furthermore, the exciples of dead apothecia are not persistent, as in the isotype specimen. These differences are probably due to the fact that the previously collected specimens are small and poorly developed and do not reflect the full variability of the species.

Table 1. *Gyalidea minuta* measurements: comparison between western and central European specimens.

	western european	central european
Apothecia:		
Diam. (mm) in preparation	0.20–0.30	0.25–0.40
Hymenium:		
Height (µm)	50–60(–65)	45–75
Ascospores:		
Length (µm)	(9.5–)12–17(–20)	10–16
Width (µm)	5–9	4.5–7.5
Transverse septa	3–5	3–4
Longitudinal septa	1–3	0–3(–4)

It is worth noting that despite the relatively detailed and long-term observations in Poland, there are very few records of *G. minuta*. This may indicate that the species has an ephemeral nature, although it is also easily overlooked in the field.

Despite its variability, *Gyalidea minuta* is quite distinctive due to its occurrence on the bark of trees and shrubs, its very small, pale and almost translucent apothecia, and the barely visible thallus. The only other epiphytic *Gyalidea* species — the recently described *G. fruticola* (Svensson & Thor 2007), which also occurs on the bark of shrubs — differs in its larger, whitish grey to light yellowish brown apothecia and considerably longer, more septate ascospores. Additionally, *G. fruticola* has a well-developed true exciple that almost encloses the disc. In wet conditions, *G. minuta* resembles *Coenogonium pineti* in the field, but the microscopic features differ markedly. Rich photo documentation of the isotype and Central European collections is available on http://www.jjh.cz/foto/.

Acknowledgments

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